AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF CLAIMS:

CLAIMS

1. (Currently amended) Method for biomechanical simulation of a set of bone joints in a patient, and particularly the spine, comprising:

- a step in which a three-dimensional digital model, at least partly represented by rigid bodies connected by joints, is recorded in a reference position;

- a step to personalise the geometry of the said model ~~relative position of each of the said rigid bodies in space~~, using data specific to a patient in the said reference position ~~for example the patient's radiographs~~;

- a step to personalise the said digital model by particularisation of interaction parameters ~~mobilities or stiffness characteristics~~ of each joint connecting the said rigid bodies as a function of characteristics observed on the patient;

characterised in that

the step to particularise the interaction parameters ~~mobilities or stiffness characteristics~~ consists of:

- acquiring the positions in space of at least a part of the rigid bodies, and making an interpolation to determine the calculated position of other rigid bodies to build up a digital table containing the relative positions of each rigid body;

- applying at least one determined constraint on the patient and acquiring information about the resultant general equilibrium position of the patient ~~other than the reference position~~;

- determining analytic functions to approximate interaction parameters ~~mobilities or stiffness characteristics~~ in order to

reproduce the measured relative positions ~~functions of the said constraints applied on the patient and geometric modifications observed on the patient, and resulting from these constraints~~, for each pair of rigid bodies.

2. (Original) Method for biomechanical simulation of a set of bone joints according to claim 1, characterised in that the digital model is defined by geometric position parameters of the rigid bodies and by stiffness parameters of the joints connecting the rigid bodies.

3. (Currently amended) Method for biomechanical simulation of a set of bone joints according to claim 1 [[or 2]], characterised in that the step representing the result of a constraint consists of recalculating the personalised model ~~in the equilibrium position~~ resulting from a set of constraints ~~for example implantation of a prosthesis or an implant~~ comprising at least one static constraint applied on at least two rigid bodies, and imposing a relative position with a mobility or stiffness different from that corresponding to the behavioural law.

4. (Currently amended) Method for biomechanical simulation of a set of bone joints according to claim 1 ~~claims 1 and 2~~, characterised in that the step recording the digital model of the set of standard joints consists of defining an alternation of rigid bodies and joints, and for each pair of bodies defining a set of digital parameters characterising the mobility or the global stiffness resulting from the action of all insertion elements ~~for example intervertebral disks~~ and connecting elements ~~for example ligaments~~ that have an effect on the interaction parameters ~~stiffnesses~~ between the two bodies.

5. (Currently amended) Method for biomechanical simulation of a set of bone joints according to claim 1 ~~at least one of the previous claims~~, characterised in that the personalisation step consists of acquiring at least one image of the set of joints of a given patient, extracting information necessary for construction of a real model from the said image by recognition of the position of joints visible in the said image, and modifying the standard model as a function of the said real model.

6. (Currently amended) Method for biomechanical simulation of a set of bone joints according to claim 1 ~~at least one of the previous claims~~, characterised in that the step recording a digital model consists of defining a standard set of digital data comprising the following for each joint represented in the form of a rigid body:

- a first geometric reference position descriptor corresponding to the geometry of the set of joints for a "standard" patient in a "reference" position, the said descriptor being determined for each rigid body relative to an adjacent body;

- a second mechanical descriptor interacting with each adjacent body, the said mechanical descriptor being representative of the behavioural law when at least one external constraint is applied to the set of joints;

the personalisation step consisting of modifying the said standard set of data by personalised data.

7. (Currently amended) Method for biomechanical simulation of a set of bone joints according to claim 1 ~~at least one of the previous claims~~, characterised in that it also comprises a correction step consisting of making radiograph image data and external acquisition data correspond, this step being broken down into two sub-steps:

- correct the radiograph reconstruction relative to the 3D curve derived from external acquisition data in the same position;

- determine the distribution of points in the 3D curve associated with the vertebras, positioned in the Stokes coordinate system and their associated tangent.

8. (New) Method for biomechanical simulation of a set of bone joints according to claim 2, characterised in that the step representing the result of a constraint consists of recalculating the personalised model resulting from a set of constraints comprising at least one static constraint applied on at least two rigid bodies, and imposing a relative position with a mobility or stiffness different from that corresponding to the behavioural law.

9. (Currently amended) Method for biomechanical simulation of a set of bone joints according to claim 2, characterised in that the step recording the digital model of the set of standard joints consists of defining an alternation of rigid bodies and joints, and for each pair of bodies defining a set of digital parameters characterising the mobility or the global stiffness resulting from the action of all insertion elements and connecting elements that have an effect on the interaction parameters between the two bodies.